

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

MINISTRY OF SETTLEMENT AND REGIONAL DEVELOPMENT
THE REPUBLIC OF INDONESIA

THE DETAILED DESIGN
OF
FLOOD CONTROL, URBAN DRAINAGE AND
WATER RESOURCES DEVELOPMENT IN
SEMARANG IN THE REPUBLIC OF INDONESIA

FINAL REPORT

COMPONENT C:
URBAN DRAINAGE SYSTEM IMPROVEMENT

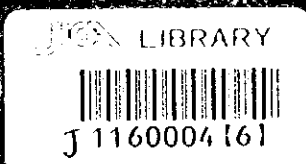
BIDDING DOCUMENTS

PACKAGE 2:
ASIN RIVER DRAINAGE SYSTEM IMPROVEMENT

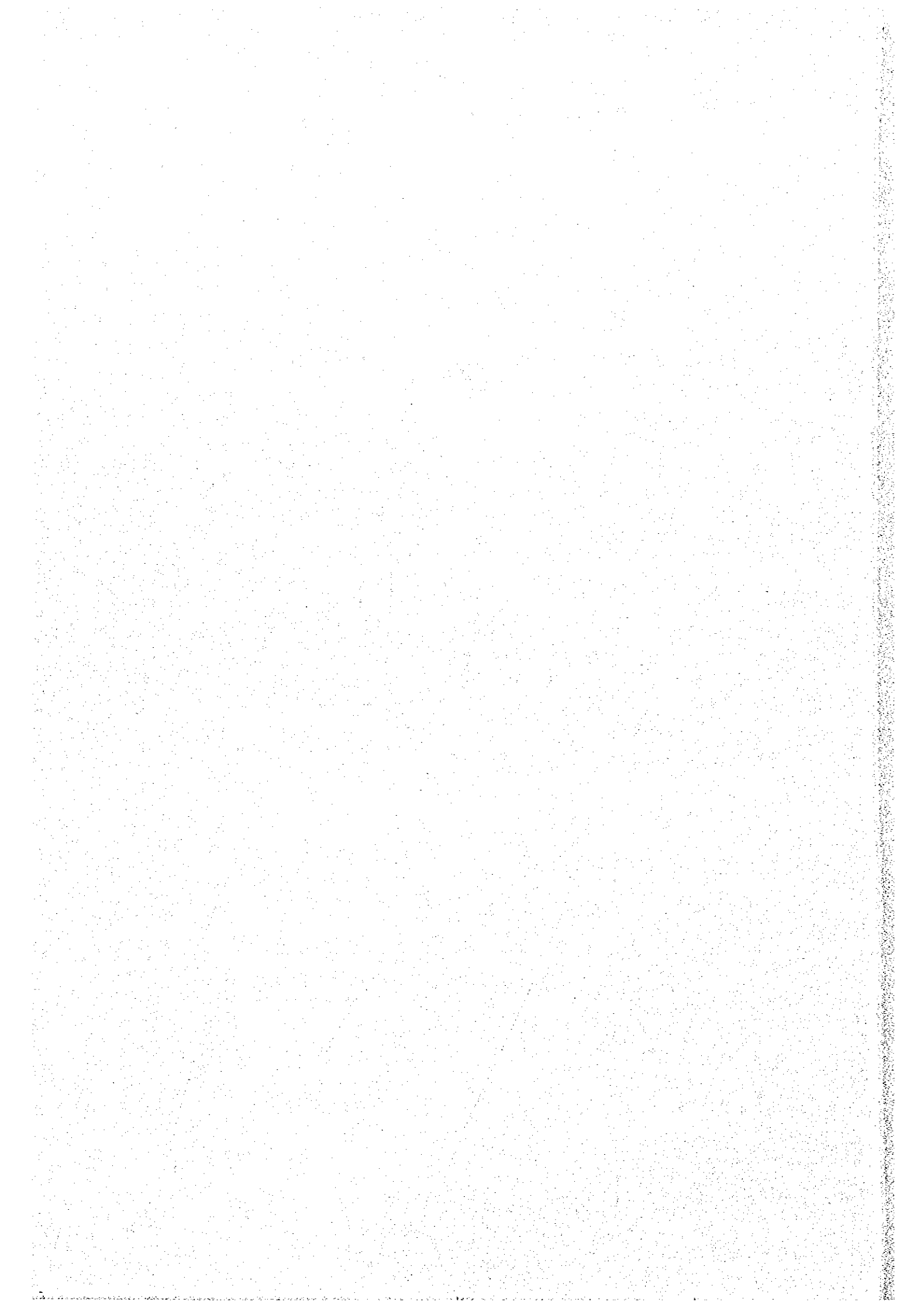
VOLUME 2:
SPECIFICATION

AUGUST 2000

CTI ENGINEERING INTERNATIONAL CO., LTD.
IN ASSOCIATION WITH
PACIFIC CONSULTANTS INTERNATIONAL
AND
PASCO INTERNATIONAL INC.



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MINISTRY OF SETTLEMENT AND REGIONAL DEVELOPMENT
THE REPUBLIC OF INDONESIA

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WATER RESOURCES DEVELOPMENT IN SEMARANG

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SECTION GS 1. GENERAL SPECIFICATION

1.1 DEFINITIONS

The term "Engineer" used in the Specification shall have the same meaning as "Project Manager" as defined in clause 1 of the Conditions of Contract.

1.2 DESCRIPTION OF THE PROJECT

1.2.1 Overview of the Project

The city of Semarang suffers frequent flooding in the wet season and water shortage in the dry season. Progressing land subsidence, mainly caused by ground water extraction, further exacerbates flooding in low-lying areas in the North of the city.

To mitigate these problems and to enhance economic development the project for Flood Control, Urban Drainage and Water Resources in Semarang has been brought about with the assistance from the Government of Japan.

The project has been broadly divided into the following three components which address different aspects of the project. The components are as follows:

- West Floodway / Garang River Improvement;
- Urban Drainage System Improvement; and
- Construction of the Jatibarang Multipurpose Dam

The object of the Urban Drainage System Improvements component is to reduce the frequency of flooding in the northern part of Semarang City. This is to be achieved by improving the discharge capacity of the Semarang River and to prevent flooding to adjacent low-lying areas by creation of dikes. Within the Asin River Drainage Area and the Bandarharjo Drainage Area large areas are too low to permit gravity drainage. In such areas, pumped drainage systems are to be implemented.

1.2.2 Contract Packages

For the purposes of implementation each of the three components has been subdivided into contract packages. There is a total of 8 packages of work in the project with the breakdown as shown in the following table. The package for the work covered by this document is highlighted to clarify its position in relation to the project components and to other packages.

COMPONENT	DESCRIPTION OF PACKAGES
West Floodway / Garang River Improvement	Package 1: West Floodway and Garang River Improvement Works Package 2: Reconstruction of Simongan Weir Package 3: Raising of Railway Bridge over West Floodway

<p>Urban Drainage System Improvement</p>	<p>Package 1: Semarang River Drainage System Improvement</p> <p>Package 2: Asin River Drainage System Improvement</p> <p>Package 3: Bandarharjo Drainage System Improvement</p>
<p>Construction of the Jatibarang Multipurpose Dam</p>	<p>Package 1: Jatibarang Multipurpose Dam including Appurtenant Structures</p> <p>Package 2: Operation and Maintenance Buildings and Goa Kreo Bridge</p>

1.2.3 Relationship between Components and Packages

In general, from the point of view of construction, there is no relationship nor interface between packages of different components.

Packages within the same component may have common interfaces.

Works by others may be under construction in the same areas during the implementation of work packages of this project.

1.2.4 Scope of Work

When completed the Asin Drainage System Improvement works will improve the drainage of a 4.4 km² area by increasing the discharge capacity of the lower reach of the Semarang River and through the creation of a poulder with a pumping system discharging to the Semarang River.

The Works to be carried out under this Contract shall, unless otherwise stated in the Contract, comprise the supply of all materials, labour, Equipment, construction plant, temporary works and anything else for the completion of the Works in strict accordance with the Contract and as directed by the Engineer.

The main elements of the Works to be completed under this package shall consist of, but not be limited to, the following:

Relocation and demolition of existing facilities

Semarang River improvement comprising:

- Preparatory Works
- Excavation of a channel to relocate a 300 m long portion of the Semarang River
- Excavation of the channel of the existing Semarang River from the interface with package 1 to the river mouth.
- Hauling and disposal of excavated material including treatment of all of the contaminated spoil from the Semarang River.
- Construction of revetments
- Raising the height of existing stone masonry dikes

Asin River Improvement comprising:

- Preparatory Works
- Excavation of the channel of the Asin River

- Hauling and disposal of excavated material including treatment of all of the contaminated spoil from the Asin River.
- Construction of revetments
- Construction of inspection roads along the Asin River
- Construction of a 200 m long box culvert under an existing public road
- Demolition of two existing bridges across the Asin River
- Construction of two bridges across the Asin River

Construction of Asin Pumping Station comprising:

- Civil Works for Pumping Station
- 3 diesel engine-driven screw pumps
- A generator set
- Auxiliary electric pumps
- Trash screen and conveyor system
- Inspection bridge (R C slabs)
- Asin Pumping Station Bridge (PC girder bridge)

Asin Pumping Station Gate comprising

- Gate pier and foundation works
- Mechanical and Electrical works

Building Works comprising the construction of:

- Pump control building
- Management Office
- Garage
- Staff house
- External works

Asin Retarding Pond comprising:

- Excavation of portion of the diverted Semarang River
- Hauling and disposal of excavated material including treatment of all of the contaminated spoil from the old Semarang River course.
- Construction of Revetments
- Construction of Inspection roads

Supplying of Maintenance Equipment including:

- Back hoe
- Dump truck
- Truck Crane

Reconstruction of Water Supply Pipeline and Telephone Cable Duct

1.2.5 Concurrent Contracts

Concurrent with the construction of the Works the Employer will have under construction, on adjacent or overlapping sites, works for contract Package 1:

Semarang River Drainage System Improvement and Package 3: Bandarharjo Drainage System Improvement.

The Contractor shall plan his operations as far as it is practicable to avoid any interference or delay to the work of the Employer and of other contractors engaged by the Employer on those operations.

To assist in co-ordinating his operations with the work being done by others, the Contractor shall establish direct site liaison and communications as necessary with the Engineer and other contractors employed by the Employer for all purposes associated with his proposed operations. In the event that the requirements of the Contractor, the Employer and other contractors conflict at any stage of the work, the Engineer shall decide the order in which work shall proceed.

The Engineer shall be given reasonable notice of all meetings between the Contractor and other contractors employed by the Employer and the Engineer shall be entitled to be present at such meetings. The Contractor is to submit to the Engineer copies of all written communications issued to other contractors at the time of issue or received from other contractors at the time of receipt if it bears direct relation to the Contract and the Works.

Subject to the rights of the Contractor under the Contract, the decision of the Engineer shall be final in the event of any disagreement between the Contractor and other contractors employed by the Employer referred to in this clause, which cannot be resolved mutually.

1.3 GENERAL INFORMATION

1.3.1 Topography

The site and adjacent area is flat and low lying. The Semarang and Asin Rivers are tidal within the site. Some low-lying areas are subject to flooding during wet weather and high tides.

1.3.2 Climate

The climate of the Semarang area is typically tropical, characterised by two (2) distinct seasons: a Rainy Season and a Dry Season. These result from the seasonal changes in the atmospheric circulation pattern, caused by the annual north-south migration of the Inter-Tropical Convergence Zone.

Summarised below are the climatic characteristics of the construction site area, which are based on climatological data observed in the period of 1968 to 1996 at BMG-Semarang Station operated by Centre of Meteorology and Geophysics.

Mean annual rainfalls	: 2,378 mm
Mean annual temperature	: 27.3 deg. C
Mean maximum temperature through a year	: 31.9 deg. C
Mean minimum temperature through a year	: 23.5 deg. C
Mean monthly rainfall during dry season (Apr to Oct)	: 124 mm
Maximum temperature during dry season (Apr to Oct)	: 32.8 deg. C
Minimum temperature during dry season (Apr to Oct)	: 23.4 deg. C

More detailed data is included in the Supplementary Information provided to Bidders.

1.3.3 Soil Conditions

Soil conditions at the site generally consist of alluvial deposits 20 to 25 m thick overlying hard clay. Further details are contained in the Supplementary Information provided to Bidders.

1.3.4 Quality of Water in the Semarang and Asin Rivers

The water in both rivers exhibits high BOD, have low dissolved oxygen and contains contaminants including heavy metals.

1.3.5 Access to the Site

1.3.5.1 Location of Site

The site is located in Semarang City, Central Java Province, Indonesia.

1.3.5.2 Existing Roads and Transportation Facilities

Access to the Site can generally be achieved via the network of public roads and streets in the vicinity of Site. The North Ring Road, which links with other main trunk roads, passes close to the site.

An airport and a shipping port exist in Semarang.

The Contractor shall fully inform himself of the conditions of roads, traffic conditions and traffic regulations with respect to gaining access to the Site for the purposes of performing the Works and shall take all necessary actions to ensure availability of access to the Site as required.

1.3.5.3 Load Limits

- a The public roads and bridges have widely varying load limits and the Contractor shall be responsible for determining the load limits existing at the time and ensuring that his Equipment does not exceed such limits. Before moving any heavy construction equipment into public roads and bridges, the Contractor shall make suitable arrangements with the appropriate Government authorities and obtain their approval for the passage of such traffic.
- b The Contractor shall use every possible means to prevent any of public roads or bridges connecting with or on the road to the Site from the being damaged by any traffic of the Contractor or his subcontractors.
- c The Contractor shall make any necessary repairs or replacement of any structure or route damaged as a result of his own negligence. Such repair or replacement shall be done to the satisfaction of the Engineer or the relevant Government authorities and shall be at the Contractor's expense.

1.3.5.4 Tracked Vehicles

The Contractor shall not travel tracked vehicles or plant on any bituminous sealed road surface or bridge. Rubber tired vehicles conforming to applicable load restrictions will be permitted to use bituminous sealed road.

1.3.5.5 Safety

The Contractor shall take necessary care at all times to ensure the convenience and safety of residents along or nearby the roads and streets used to access the Site.

1.3.5.6 Construction of Additional Access Roads

All additional roads required by the Contractor as temporary road on the Site shall be provided by the Contractor at his expense.

1.3.5.7 Maintenance

All damage caused to the public roads used by the Contractor for access to the Site shall be promptly repaired by the Contractor at his expense.

1.3.6 Sources of Materials

Earth material for fill materials, fine and coarse aggregates for concrete, sand, gravel and asphalt for road paving, cement, reinforcing bars, and fuel and oil products are generally obtainable in the Central Java area.

The Contractor shall make arrangements to procure or obtain such materials in a reasonable time.

The Contractor shall submit to the Engineer for his approval material test data of concrete aggregate, sand, gravel, cobble, etc. from the sources proposed by the Contractor before such materials are procured from suppliers or supply areas developed.

1.3.7 Spoil Disposal Areas

The Contractor shall be responsible for locating suitable spoil disposal areas for the placement of earth materials unsuitable for other purposes, surplus to requirements, for treatment of contaminated soil and for waste building materials resulting from the demolition activities.

Potential spoil disposal areas are located near the coast between the mouth of the Semarang River and Semarang Harbour as shown in the Supplementary Information supplied with the Bid Documents.

The Contractor shall be deemed to have satisfied himself of the availability of suitable spoil disposal areas and of the nature of access to such areas and shall have allowed for all cost associated with gaining rights to use, getting access to and managing spoil disposal areas, including the treatment of contaminated soil in the rates and lump sum prices in the priced Bill of Quantities.

1.3.8 Water Supply, Power and Telephone Facilities

Water, electric power and telephone services are available in the vicinity of the site. The Contractor shall make his own arrangements for procurement of such utilities.

1.4 CONTRACT DOCUMENTS AND DRAWINGS

1.4.1 Contract Documents

The Contractor will be provided with a maximum of five (5) sets of Contract Documents for his own use. Tender Documents in the Contractor's possession shall be marked superseded or returned to the Employer after issue of the Contract Documents and will not be recognised in the administration of the Contract. Further instructions issued by the Engineer shall be kept at all times on the Site by the Contractor and shall be available to the Engineer and his staff.

1.4.2 Bid Drawings

The drawings included in the Bidding Documents are to be used for bidding purposes only. The drawings show the work to be carried out in accordance with the Contract as definitely and in as much detail as is possible at the time of bidding. The Contractor may use the Bid Drawings for placing preliminary orders for materials or for preparing drawings of Temporary Works. However, the Bid Drawings shall not be used as a basis for fabrication of equipment or for construction of the Works.

1.4.3 Construction Drawings

Bid Drawings will be supplemented or superseded by such Construction Drawings as necessary for the purpose of the proper and adequate execution of the Works. Two (2) full size prints of such Construction Drawings will be issued by the Engineer to the Contractor in accordance with the construction programme required under the provisions of clause 1.5. On receipt of the Construction Drawings, the Contractor shall check them carefully and advise the Engineer in writing of any discrepancies, errors or omissions and full instructions will be furnished to the Contractor should any discrepancies, errors or omissions be found. The Contractor shall be required to perform the Work in accordance with such Construction Drawings at the applicable rates bid in the priced Bill of Quantities for such work or work of a similar nature. Although the Drawings are prepared to scale, work shall be based upon dimensions shown on the Drawings and not on dimensions scaled from the Drawings.

The Engineer may, from time to time during the construction, issue further drawings to supplement or amend the Construction Drawings, if deemed necessary. Such further drawings shall become part of the Construction Drawings.

The Contractor shall be governed by figure dimensions as given on the Drawings. Where the required dimensions are not shown in figures, the Contractor shall obtain such dimensions from the Engineer before proceeding with the construction of the portion of the Works to which they refer. In every case, detailed drawings shall take precedence over general drawings.

When additional information regarding foundation or other conditions becomes available as a result of excavation work, further testing or otherwise, and if it is found desirable to make changes in the alignment, cross section, dimensions or design of the Works to conform to such conditions, the Employer reserves the right to make such changes as in the opinion of the Engineer are necessary or desirable, and the Contractor shall forthwith comply with any such direction of the Engineer.

Bid drawing may be used as construction drawings, as defined above, when authorised, in writing, by the Engineer.

1.4.4 Drawings to be furnished by the Contractor

1.4.4.1 General

All of the various types of drawings as stated hereinafter shall be prepared in a form approved by the Engineer and submitted in advance to give the Engineer sufficient time to review and approve them without causing any delay to the field works. The Contractor shall provide qualified staff and a sufficient number of draftsmen and assistants capable of producing all drawings required.

All drawings and supporting computations to be submitted by the Contractor for the Engineer's approval shall be in English. All dimensions shall be given in the metric system. The drawings shall be in JIS A1 size (594 mm by 841 mm) unless otherwise specified or approved by the Engineer.

The Contractor shall be held responsible for all drawings and documents not submitted within the time limits stipulated in clause 1.4.5. and for all costs involved for delays and damages consequent thereto. Contractor's drawings approved by the Engineer are to be used for construction.

1.4.4.2 Working Drawings

The Contractor shall prepare the working drawings for all items of the Permanent Works on the basis of the Construction Drawings issued by the Engineer. The working drawings shall show sufficient details of the structure of the works or the construction methods or procedures such as, but not limited to, excavation and embankment fillings, concrete reinforcement bar arrangement including bending/cutting schedule and bar list, expansion joints, contraction joints, construction joints, concrete placement details, waterstop layout, equipment installation, etc., by which the Contractor will proceed with the field construction and operation. Further, drawings presenting full details of items not to be incorporated into the permanent Works but which affect the quality of work such as concrete forms, supports, etc., shall also be included in the working drawings. All the working drawings related to any section on the Works shall be approved by the Engineer prior to the time the Contractor plans to perform such section of work.

1.4.4.3 Shop Drawings

Shop drawings shall be prepared by the Contractor, or the Contractor's materials/equipment supplier on behalf of the Contractor, to show the outline, dimensions, type of material, etc., of particular items indicated in the Drawings and/or Specifications and as directed by the Engineer. Such shop drawings shall be submitted by the Contractor to the Engineer for approval.

1.4.4.4 Drawings of the Temporary Facilities

Thirty (30) days before starting any section of the temporary facilities specified in clause 1.9 hereof, the Contractor shall submit to the Engineer for approval drawings showing details of such facilities.

The drawings for temporary facilities shall show the locations and other pertinent details of the principal components of the construction plant, offices, quarters, warehouses, storage areas, workshops, labour camps and other temporary buildings and facilities which the Contractor proposes to construct in the Works area.

If any change is made in the items mentioned above during erection or after the items become operational, the Contractor shall submit revised drawings showing such changes to the Engineer for approval.

1.4.4.5 As-Built Drawings

Throughout the period of construction, the Contractor shall maintain an up-to-date set of as-built drawings for the various items of work completed. Such drawings shall show all authorised changes to the Construction Drawings and Shop Drawings to the extent that they correctly portray the true "as-built" condition of each item of the Permanent Works. The format of the as-built drawings shall be as approved by the Engineer.

The up-to-date set of as-built drawings shall be subject to periodical inspection at the Site by the Engineer and if the drawings are found unsatisfactory or not up-to-date the Contractor shall bring them up-to-date within fourteen (14) days after inspection. If any part of the permanent Works delineated on the drawings is complete, the pertinent as-built drawings, after approval by the Engineer, shall be signed by both the Engineer and the Contractor, or their representatives, and three (3) copies shall be kept by the Engineer.

The as-built drawings shall be made on high quality reproducible paper so that clearly readable copies can be made. The finished set of as-built drawings shall be submitted by the Contractor to the Engineer for his approval and transmittal to the Employer in the manner specified in Clause 1.4.5.4.

1.4.4.6 Other Drawings

Drawings other than those mentioned above, which are of a general nature, such as the proposed construction methods, temporary works for construction purposes, schematic diagrams and outlines of how various types of work are to be performed shall, as directed by the Engineer or as stipulated in the Contract Conditions and Specification, be submitted to the Engineer for approval.

1.4.4.7 Form and Presentation of Drawings

a General

All shop Drawings and Working Drawings produced by the Contractor or his subcontractors for this Contract shall use a common system of sizes, title blocks and numbers in accordance with this Subclause, regardless of who produces the drawings.

b Drawing Sizes and Standards

All drawings shall be drawn in the accordance with clause 1.4.4.1.

c Title Blocks

i The Contractor shall submit a sample of the title block he proposes to use for approval by the Engineer. The general format of the title blocks shall follow those of this Specification.

ii The Contractor or his subcontractor's title blocks shall show the Contractor's and subcontractor's name, the date, the title, and number of the drawing and each new issue of the drawing shall be identified by a revision letter as a part of the number. In addition each drawing shall show the following details in the lower right hand corner:

FLOOD CONTROL, URBAN DRAINAGE AND WATER

RESOURCES DEVELOPMENT IN SEMARANG

COMPONENT : URBAN DRAINAGE SYSTEM IMPROVEMENT

PACKAGE 2 : ASIN DRAINAGE SYSTEM IMPROVEMENT

DRAWING NO. :

- d Numbering System
 - i Primary reference to drawing numbers on all drawings, correspondence, operation, and maintenance instructions and elsewhere, shall be the number from the Engineer's numbering system, which system will be notified to the Contractor.
 - ii The Contractor may, if he desires, insert his own reference number in the appropriate place on the title block.
 - iii Drawing number shall be as allocated by the Engineer.
- e Quality

The quality of working drawings, shop drawings, "as-built" drawings and drawings for temporary works shall be in accordance with Clause 1.4.5.
- f Drawing Index

The Contractor shall compile a drawing index for all drawings produced by himself and his subcontractors. The Contractor shall submit an up-to-date copy of each sheet of the index to the Engineer at three monthly intervals or on request.
- g Drawing on Site

Copies of the latest revisions of all drawings shall be sent to the Contractor's site office as soon as possible after they are approved. The drawings shall be available at all reasonable time for inspection by the Engineer.

1.4.5 Submittal and Approval of Contractor's Drawings

1.4.5.1 General

- a It is to the Contractor's advantage to prepare his drawings and submit them to the Engineer at the earliest possible time to avoid delay in the fieldwork due to lack of approved Drawings on hand for the construction crew.
- b Any work done prior to the Engineer's approval of the drawings shall be at the Contractor's risk. Approval by the Engineer of the Contractor's drawings shall not relieve the Contractor from any of his obligations in the complying with the provisions of the Contract.

1.4.5.2 Procedure for Submittal and Approval

- a Unless otherwise specified the Contractor shall submit his working drawing, shop drawings and other required drawings to the Engineer for approval at least sixty (60) days prior to the commencement of construction of any particular item of work. Shop drawings for any particular item which has to be fabricated outside of the Site shall be submitted early enough to allow adequate time for review, approval, fabrication, transportation and receipt at the Site.
- b Four (4) clearly readable print copies of each drawing shall be submitted to the Engineer by means of a standard transmittal sheet. The format of the transmittal sheet shall be as approved by the Engineer.
- c The Engineer shall have the right to direct the Contractor to provide additional details and change in the drawings if the are necessary to ensure compliance with the provisions and intent of the Specifications. Within thirty (30) days after the receipt of the drawings submitted by the Contractor, and the Engineer shall return one (1) copy thereof of the

Contractor marked "Approved for Construction", "Approved for Construction-Except as Noted", or "Not Approved Resubmit".

- d The return and receipt of any approved drawing shall be deemed to authorise the Contractor to proceed with the work covered by such drawing, but before proceeding with the work the Contractor shall first submit to the Engineer by logged transmittal sheet two (2) prints of each drawing. When requested by the Engineer, one (1) transparency of working drawings and shop drawings shall also be submitted together with two (2) prints. Copies of all approved drawings shall be maintained at the Contractor's site office in proper order.
- e When correction or revision is directed on the Contractor's submitted drawings, the Contractor shall make the necessary corrections and/or revisions in a timely manner and shall resubmit them in two (2) copies to the Engineer in the same manner as for new drawing. This procedure shall continue until the drawings have been finally approved.

1.4.5.3 Other Information

All applicable requirements of this Clause shall apply equally to other submittals described in Clause 1.5.

1.4.5.4 As-Built Drawings

Within one (1) month following the issue of the Certificate of Completion of the Works, the Contractor shall furnish to the Engineer, for his approval; and transmittal to the Employer, the final version of as-built drawings. These as-built drawings shall consist of:

- a Two (2) sets of transparent polyethylene sheets ;
- b Three (3) sets of full-sized (A1 size) bound copy ; and
- c Ten (10) sets of reduced size (A3 size) bound copy.

1.4.6 Payment

Payment for Drawings in accordance with this clause 1.4 shall be made at the Lump Sum price entered in the priced Bill of Quantities.

For the purposes of monthly progress payments the amount completed, expressed as a percentage of the total number of drawings required to be completed by the Contractor, shall be determined. Payment shall be calculated by multiplying the percentage completed by the lump sum for Drawings entered in the priced Bill of Quantities. Payment for drawings shall never exceed the lump sum entered in the priced Bill of Quantities

1.5 CONSTRUCTION PROGRAMME, CONSTRUCTION PLAN, PROGRESS REPORTS AND OTHER SUBMITTALS

1.5.1 General

The Contractor shall prepare and submit a construction programme, a construction plan, progress reports and other required documents in the manner specified herein.

1.5.2 Construction Programme

1.5.2.1 General

- a In accordance with Clause 27 of the Conditions of Contract , within sixty (60) days after receiving the Letter of Acceptance, the Contractor shall submit to the Engineer a detailed construction time schedule of the overall works for approval. The schedule shall be in accordance with the construction programme submitted with the Tender and approved by

the Letter of Acceptance but shall provide significantly more details in accordance with this clause. The details required shall include each main activity such as, but not limited to, each main item referred to in the Bill of Quantities associated with each of the main items of work as listed in clause 1.2.4 of the General Specification. Activities shown on the schedule shall consist not only of the actual construction sequence including mobilisation, but also time allowances necessary for the preparation and approval of drawings and samples, for the procurement and shipment of materials and equipment including obtaining licences and permits for procurement and/or importation, for the installation of the special time, for possible delays caused by floods or inclement weather conditions, religious holidays, etc. The construction time schedule shall be prepared and submitted in computerised bar chart and CPM network forms. The critical path(s) shall be marked on the network as well as float for each activity. An original copy of the software and manuals used to prepare this schedule shall be submitted to the Engineer for the use of his Consultant for the duration of the Contract. The Contractor shall submit copies of the construction time schedule and all subsequent revised Construction Programmes in accordance with Clause 27 of the Conditions of Contract and shall also submit the computer input data on floppy disk on each occasion. The software shall also be capable of comparing actual and planned progress both physically and financially and this information should be prepared and submitted on a fortnightly basis.

- b The construction time schedule shall be so prepared that all the Works are to be completed by the Intended Completion Date as stated in Contract Data in accordance with clause 17 of the Conditions of Contract.
- c The construction time schedule shall be subject to modifications and changes as necessary and, after approval by the Engineer, shall become part of the Contract.
- d The Construction Programme as approved by the Engineer shall be closely monitored and kept current. It shall be formally updated by the Contractor once in every four (4) months or at any time directed by the Engineer, and submitted to the Engineer each time for approval. Revisions to the Construction Programme shall show the effects of any variations and compensation events.

1.5.2.2 Revision of Programme

- a If in the course of execution the rate of progress of the Works or any section thereof falls behind the approved Construction Programme and if, in the opinion of the Engineer, the Contractor shall not be able to complete the Works or such section of the Works by the time required, then the Engineer may order the Contractor to increase his work force or supplement the Construction Plant on Site or take any other adequate steps to expedite the rate of progress for that section, submit for approval a revised construction programme showing the proposed measures to complete the Works on time.
- b If the Contractor proposes to modify or revise the Construction Programme and if the change affects the Engineer's design and drawings programme, the Employer shall not be responsible for the consequence of the late issuance of Construction Drawings attributable to the change even after the approval by the Engineer of the modification or the revision of the Construction Programme.

1.5.3 Construction Plan

1.5.3.1 General

Within sixty (60) days after receiving the Letter of Acceptance for the whole Works under the Contract as specified the Contract Data, the Contractor shall submit a revised general construction plan including a detailed equipment to be mobilized, particulars of Temporary Works and method statements for major items of work to the Engineer for approval. The plan shall be prepared on the basis of the General Plan submitted by the Contractor with his Bid and the following mandatory requirements. Any instructions given by the Employer and/or the Engineer on and after award of the Contract shall be incorporated.

1.5.3.2 Mandatory Requirements to be included in the Construction Plan

The construction plan shall take into account the following mandatory requirements:

- (a) The demolition of the two existing bridges across the Asin River and the construction of the replacement bridges shall be scheduled to minimise disruption to the public.
- (b) Structural excavation works for the Asin Box Culvert shall include the use of shoring in order to minimise the working space required and the disruption to the public.
- (c) The Contractor shall ensure that his operations do not interfere with the existing pumped drainage systems along the Asin river until the Asin Pumping Station is commissioned. In the event that the Contractor opts to demolish any or all of the existing pumping stations prior to the commissioning of the Asin Pumping Station he shall install, operate and maintain alternative pumps of capacity not less than the capacity of those demolished for the interim period to ensure that the area protected by the existing pumps continues to have the same level of flood protection.
- (d) The Contractor shall ensure that his plan for the re-routing of traffic during the construction of the Asin Box Culvert has the approval of the Semarang Municipal Government.
- (e) Telephone Cable Duct Reconstruction shall be scheduled to minimise interruption to service in full consultation with the appropriate telecommunication authorities and who shall be engaged by the Contractor to carry out all cable work.
- (f) Water Supply Pipe Reconstruction shall be scheduled to minimise interruption to service in full consultation with the appropriate water supply authorities and who shall be engaged by the Contractor to carry out all piping work for the reconstruction.
- (g) Coffering in the Semarang River shall not be permitted during the months of December to March inclusive in order to allow the full width of the channel for discharge of flood flows.
- (h) Pile driving shall not be carried out at night.

1.5.4 Weekly Schedule

The Contractor shall, at the end of each week, submit to the Engineer for his review and comments two (2) copies of a weekly schedule for the succeeding week in a form approved by the Engineer. The schedule shall contain appropriate comments with regard to the work to be performed on each major item as well as other construction work related to the execution of the Works including procurement of materials, transportation of materials

and equipment, preparation of drawings and other items required by the Engineer.

1.5.5 Monthly Progress Report

1.5.5.1 Written Report

The Contractor shall submit, before the tenth (10th) day of each month or at any time designated by the Engineer, five (5) copies of a monthly progress report in a form acceptable to the Engineer detailing the progress of the Works during the preceding month. The report shall contain, but not be limited to, the following items:

- (a) A brief but detailed description of all works executed during the reporting month together with a cumulative summary of progress to date for each main activity.
- (b) Total overall percentage of work completed up to the end of reporting month as well as the total overall schedule percentage completed and the forecast completion date computed by the critical path method (or other method previously approved by the Engineer) as of the end of the reporting month with appropriate comments on progress.
- (c) Actual percentage of each main work item completed, as well as their schedule percentage, with appropriate comments on their progress. The percentages shall be provided for each month and cumulatively.
- (d) Schedule of activities to be started within the succeeding two (2) months with the forecast starting and completion dates. If the dates are different from those shown on the approved Construction Programme an explanation shall be given.
- (e) List of manpower by trade, and supervisory personnel by position, employed during the reporting month.
- (f) List of Construction Plant and materials on Site used in the execution of the Works including those that arrived at or were removed from the Site. The records shall include duration for which Equipment was not in working order.
- (g) Total work quantities to be incorporated in the permanent Works including, but not limited to, the following items:
 - i. Total quantities of various classifications of excavation and embankment.
 - ii. Total quantities of various classes of concrete poured.
 - iii. Main items of the temporary works performed during the reporting month.
 - iv. General description of the weather conditions during the reporting month including records of each rainfall duration.
 - v. List of each accident involving, lost time, and/or death of any person, damage suffered by Works, properties and equipment.
 - vi. Occurrence of any event or condition that might delay or prevent completion of the Works in accordance with the current, approved Construction Programme and the steps taken by the Contractor to correct the situation.
 - vii. Schedule of the amount of payments received to date and the amount of any monthly invoice submitted but not yet paid.

- viii. Estimated amount of payment from the Employer to the Contractor for the succeeding month.
- ix. Colour photographs (not smaller than 8 cm x 12 cm) of the work progress of all major components of the Works from start to completion taken at locations directed by the Engineer. A brief description and date of each photograph shall be stated. The date shall be imprinted in each negative and photograph. A minimum of two photographs shall be taken of each major component under construction in the month including temporary works.
- x. Any other matters which may be required under the Contract or statement concerning any matter arising from or relating to the execution of the Works during the reporting month.

1.5.5.2 Video Report

The Contractor shall make a video tape recording of the progress of the Works on a monthly basis and shall engage a professional recording company approved by the Engineer to carry out the work.

The monthly recording shall be of 30 minutes duration and shall be carried out throughout the duration of the Contract or as directed. Additional recordings may be necessary to record significant milestone events.

A copy of each monthly recording shall be submitted to the Engineer. The recording shall be accompanied with dialogue in English, describing the events recorded.

At the completion of the Works the monthly recordings shall be compiled and edited into a single recording of four hours duration, or as directed, complete with approved dialogue and soundtrack and submitted to the Engineer.

1.5.6 Daily Report

The Contractor shall prepare daily and periodical reports in a form approved by the Engineer. The following items:

- a Weather conditions;
- b Staff and labour force employed on the work;
- c Materials and equipment on Site;
- d Work in progress including locations and estimates of daily production;
- e Work in preparation;
- f Accident or any other reason causing a suspension of the work;
- g Occurrence of any event or condition that might delay the progress of work; and
- h All other information relevant to the progress of the Works.

1.5.7 Joint Meeting to Discuss Progress

A regular meeting between key personnel of the Engineer and the Contractor's authorised representative shall be held once a week at a time agreed upon by both parties to discuss the progress being made, the work proposed for the forthcoming week and any problem having a direct bearing on the immediate or near term work activities.

1.5.8 Other Submittals

During the course of the Works the Contractor shall submit to the Engineer for approval construction programmes, design computations, financial schedules, construction plans, various plans of work, survey, tests and operation, reports on the results of survey, test and inspection, written description of equipment to be used, pamphlets, brochures and samples of materials and equipment, and other required documents and good as prescribed in this Specification and as directed by the Engineer. Such submittal of documents and good shall be made in advance to avoid causing any delay to the field works. The procedure for submittal and approval shall be in the same manner as specified in Clause 1.4.5.

1.5.9 Payment

Except as otherwise specified, separate payment will not be made for complying with the requirements of clause 1.5 and all costs shall be deemed to be included in the rates and lump sum prices entered in the priced Bill of Quantities.

1.6 STANDARDS AND TESTS

1.6.1 Standards and Specifications

All materials and equipment to be furnished and installed for the Works and all construction works to be executed under the Contract shall conform to the respective standards and specifications stated in the Specification. Where applicable standards and specifications for any material, equipment and construction are not stated in the Specification, they shall conform to the latest edition of the relevant standards of the following organisations:

JIS	: Japanese Industrial Standard
AASHTO	: American Association of State Highways and Transportation Officials
JCEA	: Japan Civil Engineers Association
ACI	: American Concrete Institute
AISI	: American Iron and Steel Institute
ASTM	: American Society for Testing and Materials
AWS	: American Welding Society
USBR	: Water and Power Resource Service, United States Department of the Interior (formerly United States Bureau of Reclamation)
SSPC	: Steel Structures Painting Council
HGPS	: Hydraulic Gate and Penstock Association, Japan
JRA	: Japan Road Association
SII	: Standard Industries Indonesia
PBI	: Peraturan Beton Indonesia (Indonesian Concrete Code)
PKKI	: Peraturan Konstruksi Kayu Indonesia (Indonesian Timber Construction Code)

If the Contractor proposes equivalent standards or specifications for materials and equipment, he shall state the exact nature of the proposed change and shall submit complete standards and specifications in English, including information and data on such materials and equipment, for approval of the Engineer. Such submittal shall be made in sufficient time for approval by the Engineer and failure to do so the purchase of any proposed equivalent materials and equipment prior to the approval of the Engineer shall be at the Contractor's risk.

The Contractor shall have available in his site office at all times at least one (1) copy of every standard referred to in this Specification or necessary for the execution of the Works.

1.6.2 Inspection, Examination and Testing of Materials and Equipment

Materials and equipment furnished by the Contractor, which will be incorporated in the Permanent Works, shall be subject to inspection, examination and test as provided in the Contract. To allow sufficient time to provide for inspection, examination and testing, the Contractor shall submit to the Engineer at the time of issue, copies in duplicate of all orders, including drawings and other pertinent information covering the materials and equipment to be furnished by the Contractor, or shall submit other evidence in the event of such orders being issued verbally or by letter. The inspection, examination and testing of materials and equipment or the waiving of inspection, examination and testing thereof shall in no way relieve the Contractor of the responsibility for furnishing materials and equipment meeting the requirements of this Specification.

All examinations and tests shall be carried out by the Contractor in the presence of the Engineer in accordance with the normal practice for such examination and tests. The Contractor may carry out the examinations and tests with his staff and equipment available at the Site. Examinations and tests carried out off the site shall be made at a laboratory approved by the Engineer.

The Engineer shall be at liberty to reject any material or equipment that does not comply with the requirements of the Contract notwithstanding any previous approval thereof. The Contractor shall not be entitled to any extra payment or extension of time for completion of the Works on account of the rejection of materials due to their non-compliance with the requirements of the Contract, or of the waiting time required for carrying out the examinations and tests.

The Contractor shall furnish test samples as requested and shall provide reasonable assistance and co-operation as necessary to permit tests to be performed on materials or work in place, including reasonable stoppage of work during testing.

The Contractor shall co-operate in all manners required with the independent testing team authorised under Keputusan Menteri Pekerjaan Umum, Nomor 22/229/KPTS/1999, dated 13 July 1999.

1.6.3 Test and Testing Laboratory

The Contractor shall provide the laboratory with all of the necessary testing equipment and apparatus. The Contractor shall provide his own qualified staff and laboratory assistants capable of carrying out all of the laboratory testing required for all the materials to be used for the Works including physical and/or mechanical properties of soil, aggregate, concrete, asphalt, their products and so on, as specified in the Specification. All testing

equipment and apparatus provided by the Contractor in accordance with this Clause shall remain the property of the Contractor on completion of the Works.

The Contractor shall carry out all field tests such as compaction tests, concrete workability tests and so on in accordance with the manner and frequency prescribed in the Specification and shall provide the testing equipment and apparatus, testing staff, labour and consumables necessary for carrying out his field testing. The Contractor shall prepare schedules of his field and laboratory testings taking into account the work progress schedule and shall submit them to the Engineer for approval.

The Engineer will supervise the Contractor's testing for the purpose of adequate and sufficient quality control of the Works during its execution. The laboratory and equipment shall be made available and accessible to the Engineer at all times.

The Contractor shall identify specific locations of tests directed by the Engineer, by survey if necessary, and include such information in all test reports.

All test reports shall be submitted to the Engineer as soon as possible and within 24 hours of their completion.

1.6.4 Payment

Separate payment will not be made for complying with the requirements of this Clause 1.6 and all costs shall be deemed to be included in the rates and lump sum prices entered in the priced Bill of Quantities for the items to which the standards and tests apply.

1.7 MOBILISATION AND DEMOBILISATION

1.7.1 General

Mobilisation shall refer to the transportation of construction plant and equipment, based on the construction programme submitted by the Contractor in accordance with Clause 27 of the Conditions of Contract and Clause 1.5 hereof, from the place of origin to the Site where they are to be used. When the mobilisation has been substantially completed to the extent the Works can be effectively performed and obtain the scheduled progress, the Contractor shall submit the required documentation for the Engineer's approval and certification. Subject to the authorisation of the Engineer the Contractor may at any time during the execution of the Works, make alteration, reduction and/or improvement to the Equipment.

Demobilisation shall be made after the written approval of the Engineer and include the removal of the Contractor's Equipment from the Site.

1.7.2 Equipment

The Contractor shall furnish the necessary Equipment, as defined in Clause 1 of the Conditions of Contract, required for the execution of the Works. The Engineer may, if he consider it necessary for the execution of the Works in accordance with the Contract, instruct the Contractor to furnish additional Equipment. All equipment to be furnished by the Contractor shall be complete with all spare parts and the Contractor shall maintain a sufficient stock of such spare parts to ensure the efficient execution of the Works.

1.7.3 Programme and Notice of Transportation

Concurrently with the submittal of program in accordance with Clause 27 of the Conditions of Contract, the Contractor shall furnish the Engineer with a complete transportation programme for Equipment, showing in detail the sequence of transportation and delivery on the Site to comply with his proposed construction programme.

The Contractor shall keep the Engineer informed of the arrival of plant, materials and Equipment at the Site.

1.7.4 Payment

Payment for mobilisation and demobilisation will be made at the lump sum price tendered therefore in the priced Bill of Quantities. Progress payment will be made in the following manner :

- i Seventy percent (70 %) of each approved Sub-item of the lump sum price tendered in the priced bill of Quantities will be paid upon certification by the Engineer that mobilisation has been substantially completed for each item of plant or equipment shown in the Contractor's breakdown submitted with his bid.
- ii The remaining thirty percent (30 %) of each approved Sub-item of the lump sum price tendered in the price Bill of Quantities will be paid upon certification by the Engineer that the demobilisation of concerned equipment has been completed for each of the items of plant or equipment mentioned above.

Monthly estimates of progress for payments of mobilisation and demobilisation shall be supported with appropriate records and documents showing that mobilisation or demobilisation for each item of plant or equipment as mentioned above has been completed during the month for which the estimate is prepared.

1.8 ESTABLISHMENT

1.8.1 General

The items described hereunder refer to the work required to be performed by the Contractor for his establishment on site and to prepare the site ready for the execution of the Works

1.8.2 Temporary Roads and Bridges

1.8.2.1 General

- a. The Contractor shall construct and maintain temporary construction roads, including haul and access roads, bridges, and the associated drainage and stream crossing facilities necessary for the execution of the Works. The Contractor shall also improve or modify the existing roads within the site of the Works provided by the Employer for the purpose of the execution of the Works. Demolition and removal of this temporary work shall be subject to the approval of the Engineer.
- b. The Contractor shall make the necessary arrangements with the appropriate Local Government Authorities and private land owners where the site of the Works will encroach on land outside the right of way of such roads .

- c. The Contractor shall make the necessary arrangements with the appropriate Local Government Authorities and private landowners where new temporary access and haul roads are required through private land.
- d. Not less than thirty (30) days before the Contractor intends to commence construction of any part of the temporary construction roads, the Contractor shall submit to the Engineer for approval a detailed construction plan including:
 - The location and design of the temporary construction roads, including the associated drainage and stream crossing facilities; and
 - The construction method and construction time schedule of such temporary construction roads,

The location of these roads shall be in accordance with the Contractor's proposals submitted with his Bid and approved in the Letter of Acceptance or as otherwise approved by the Engineer.

1.8.2.2 Design Requirements for Temporary Roads and Bridges

- a. The temporary construction roads shall be designed so as to generally have a driveway width of 6.0 m, where practicable to do so, and a longitudinal slope of less than 10 %. The roads shall be provided with an area for shunting vehicles at appropriate intervals. When a temporary slope is necessary at the riverside of a dike, such slope shall be down to the downstream side from the top of dike.
- b. The Contractor shall execute the required clearing and grubbing and construct the temporary construction roads in accordance with the approved drawings and construction programme. Topsoil shall be stripped and stockpiled for restoration purposes in accordance with paragraph d. of this Subclause. Surplus material from required excavation may be allowed as construction material for the construction roads. The Contractor shall provide a gravel pavement or other measures in stretches where trafficability is in the opinion of the Engineer, not sufficient for the efficient transportation of equipment and materials.
- c. Where the temporary construction roads cross existing stream flow such as a river, drainage channel or irrigation channel, the Constructor shall provide an appropriate section of concrete or steel pipe or other means to allow water discharge. All crossings damaged or destroyed by heavy rainfall shall be restored by the Contractor at his cost if, in the opinion of the Engineer, such restoration is necessary.
- d. The Contractor shall be responsible for the repair at his own expense of any damage to the temporary construction roads caused by the passage of heavy equipment and trucks used by the Contractor or his subcontractors for the execution of the Works or caused by other contractors employed on the site by the Employer or by the public, where applicable. On the completion of the Works, such temporary construction roads, except those which are directed to be left on the Site, shall be removed and the land restored to its original condition to the satisfaction of the Engineer.

1.8.2.3 Use of Roads by Others

During the period of the Contract, the Employer and other contractors employed by the Employer will be engaged on other works in the vicinity of the Works covered by this Contract, and the Contractor shall allow the Employer and such other contractors free and unrestricted use of all temporary roads. Public roads shall remain open to the public at all times.

1.8.3 Contractor's Site Office and Facilities

1.8.3.1 General

The Contractor shall provide, maintain and operate the Contractor's Site office and construction facilities which include, among other things, staff quarters, warehouse, workshop, laboratory, labour camp and other temporary buildings and facilities necessary for the execution of the Works, and shall remove them upon the completion of the Works except as otherwise specified in the Contract or directed by the Engineer.

The Contractor shall submit revised layout plans and general particulars of such temporary buildings and facilities to the Engineer for his approval. The construction of any buildings or facility shall not be started until the Contractor's proposals have been finally approved by the Engineer.

1.8.3.2 Construction Camp

- a The Contractor shall make his own arrangements for the obtaining a suitable site for the construction by the Contractor, as proposed in his Tender and approved in the Letter of Acceptance, of housing camps and for other facilities and amenities for his employees and for the employees of his subcontractors.
- b The Contractor's staff quarters and labour camp shall be provided with all the necessary services for drainage, electricity, lighting, roads, paths, parking spaces, fencing, sanitation including sewage treatment, water supply, cookhouse, fire prevention and fire fighting equipment.

1.8.3.3 Contractor's Site Office

The Contractor shall provide the Site office as soon as the preparatory work at the Site takes place. The Site office shall be constructed in a location approved by the Engineer with all the necessary facilities for drainage, lighting, sanitation, parking spaces, etc.

1.8.3.4 Completion of Site Office and Construction Facilities

The Contractor shall notify the Engineer in writing as soon as the temporary buildings and facilities have been constructed and are ready for operation. The Engineer shall certify that such buildings and facilities have been constructed in accordance with the approved plans.

1.8.4 Engineer's Site Office and Facilities

1.8.4.1 General

The Contractor shall provide, maintain and operate an office facility for the sole use of the Engineer and his staff. The facility shall include desk working areas for the Engineer's staff numbering 5 and meeting facilities shall cater for 10 persons.

The office facility may be either an existing building in close proximity to the site, owned or rented by the Contractor, or a new, temporary facility constructed on or in close proximity to the site.

The Contractor shall submit plans and particulars of his proposal for the Engineer's Site office for the Engineer's approval prior to constructing the facility or entering into any agreement for renting a premises for the intended purpose.

The requirements to be fulfilled under this clause are detailed hereunder.

1.8.4.2 Office Building

The building shall be not less than 70 m² in plan area and shall contain rooms for use as office space and for the conduct of meetings, a kitchen and a toilet.

All offices and meeting rooms shall be air conditioned.

Architectural items to be provided shall include blinds, floor coverings and light fittings.

Furniture to be provided shall include filing cabinets, drawing storage units, book shelves, desks and chairs, meeting table and chairs.

Utility services shall included electric power, telephone, water supply and sewerage. The cost of all utility services except telephone usage charges shall be borne by the Contractor.

The Contractor shall provide all other incidental items such as white boards, desk lamps, water cooler, crockery etc. in order that the office environment is functional, secure, complete and to the approval of the Engineer.

1.8.4.3 External works

If the facility is constructed on a green site, external works shall include perimeter fencing, paved car parking for a minimum of 2 vehicles and footpaths.

If the facility is an existing premises parking areas for at least 2 vehicles shall be exclusively available for the Engineer and his staff. Other external works, as specified above, shall be provided to the extent practicable.

1.8.4.4 Manpower

The Contractor shall provide full-time watchmen and a janitor.

1.8.4.5 Maintenance and Operation

The Contractor shall ensure that the Engineer's site office is at all times maintained in good order and provided with the utility services noted above.

1.8.4.6 Removal and Hand-over

At the conclusion of the Contract the Contractor shall, in the event that the facility comprises a new, temporary building on or near the site, remove all of the buildings and facilities provided under this clause and reinstate the area to the satisfaction of the Engineer and all items of furniture and equipment shall be handed over to the Employer.

In the event that the facility is owned or rented by the Contractor, at the conclusion of the Contract the facility shall cease to be part of the Works and all items of furniture and equipment shall be handed over to the Employer.

1.8.5 Payment

1.8.5.1 Contractor's Site Office and Facilities

Payment for Contractor's Site Office and Facilities will be made at the lump sum price entered therefore in the priced Bill of Quantities

Monthly progress payment will be calculated on the basis of paying 70% of the said lump sum in proportion to monthly progress of the whole of the Works.

The final payment, representing 30% of the lump sum, will be paid following the Engineer's approval of the removal of the Contractors site office and facilities as applicable.

1.8.5.2 Engineer's Site Office and Facilities

Payment for Engineer's Site Office and Facilities will be made at the lump sum price tendered therefore in the priced Bill of Quantities.

Monthly progress payment will be calculated on the basis of paying 70% of the said lump sum in proportion to monthly progress of the whole of the Works.

The final payment, representing 30% of the lump sum, will be paid following the Engineer's approval of the removal of the Engineer's site office and facilities as applicable.

1.9 TEMPORARY FACILITIES

1.9.1 General

1.9.1.1 Temporary Facilities

- a For the purposes of this Specification temporary facilities shall include facilities such as crushing plants, concrete batching plants, casting yards, prestressing yards, etc. used for the preparation and storage of materials for the Works.
- b All Temporary Facilities shall be provided, installed, operated, maintained and subsequently removed by the Contractor, except as otherwise provided in the Contract.

1.9.2 Approval of Temporary Facilities

- a The Contractor's proposal for the erection of all temporary facilities shall be in accordance with the proposals submitted in with the Contractor's Bid or with such modifications as approved by the Engineer from time to time.
- b The Contractor shall submit to the Engineer for approval, within thirty (30) days from the receipt of the Letter of Acceptance, the revised general plan of temporary facilities, based on the proposals in the Bid including scale, capacity, layout, dimension, installation programme and schedule, and foundations. The Engineer may direct the Contractor to modify or change the proposals, if in the opinion of the Engineer it is deemed necessary. Such direction of the Engineer shall not relieve the Contractor from any of his obligations and responsibilities under the Contract.
- c Before starting any part of temporary facilities the Contractor shall, at least thirty (30) days before starting construction, submit to the Engineer for the approval the detailed proposal for such part of the temporary facilities including plans, drawings, schedules, and other information as

specified in clauses 1.4 and 1.5 of the General Specification which will supplement or modify the general plan of the temporary facilities already submitted by him.

1.9.2.1 Removal of Temporary Facilities

Unless otherwise directed or approved by the Engineer, all temporary facilities constructed by the Contractor shall be removed and the area made safe, vegetation and natural drainage reinstated prior to the end of the Defects Liability Period.

1.9.2.2 Payment

Separate payment will not be made for temporary facilities and all the costs thereof shall be deemed to be included in the various rates and lump sum prices entered in the priced Bill of Quantities.

1.9.3 Use of Construction Facilities and Work Areas

1.9.3.1 Location of Temporary Works

The Contractor shall, as far as practicable, lay out the temporary facilities within the Site. Owing to the dense development adjacent to the site it is expected that additional temporary works areas will be required. The Contractor shall make his own arrangements for the obtaining a suitable site for any of his temporary works which cannot be accommodated within the site. All costs associated with obtaining such areas shall be borne by the Contractor.

1.9.3.2 Damage to Crops and Property

The Contractor shall limit the movement of his crew and equipment so as to minimise damage to crops and property. Before acceptance of the Works by the Employer the Contractor shall restore the land occupied by the temporary facilities as nearly as practicable to its original condition.

1.9.3.3 Indemnity against damage or injury

The Contractor shall be directly responsible to the Employer for any damage or injury to crops or land whether in the possession of the Employer or any other person, resulting from his operations and shall indemnify and keep indemnified the Employer against all losses and claims for such damage and injuries which may arise in connection with the risk as provided for in clause 12 of the Conditions of Contract

1.9.3.4 Rights of Others to Use Construction Facilities

Other contractors employed by the Employer and their workmen and workmen of the Employer and of other Government authorities who will be carrying out work on or near the Site of the Works shall have the right to use, without charge, the access facilities, including bridges and roads, of which the Employer has given possession to the Contractor or which have been constructed or acquired by the Contractor for use in constructing the Works.

1.9.3.5 Facilities to be made available by the Contractor

Reticulated water, drainage systems and any other such facilities, constructed or acquired by the Contractor for use in carrying out the Works, which are available without entailing any appreciable increase in cost to the Contractor as determined by the Engineer shall be made available without

charge to the Employer and any other contractors employed by the Employer at mutually convenient times.

1.9.3.6 Temporary Works by Others

- a In the event that other contractors employed by the Employer have constructed temporary works in the vicinity of the Works covered by the Contract, the Contractor shall have free and unrestricted use of all temporary roads constructed by other contractors but shall not cause any obstruction on such roads.
- b Before the completion of other contracts, the Contractor shall notify the Engineer of the temporary roads constructed by other contractors and areas of land utilised by temporary works of other contractors that he proposes to use for the remaining period of such temporary roads and areas, as approved by the Engineer, and they shall be deemed to form part of Contractor's obligations under this clause as if constructed by him.
- c The Contractor shall maintain such roads and areas from the date of possession in accordance with the requirement for all items provided under Establishment. On the completion of the Works, such roads and areas, unless otherwise approved by the Engineer, shall be removed and the land restored to its original condition prior to commencement of the other contracts to the satisfaction of the Engineer.
- d Separate payment will not be made for maintenance, improvement, removal and reinstatement of these roads and areas, where required, and the cost of all works required by this clause shall be deemed to be included in the various items in the priced Bill of Quantities.

1.10 TEMPORARY TRAFFIC CONTROL

1.10.1 Scope

To facilitate traffic through or around the Works, or wherever ordered by the Engineer, the Contractor shall install and maintain at prescribed points on the Site and at the approaches to the Site, traffic signs, lights, barricades and other facilities as required by the Engineer for the direction and control of traffic. The wordings on all signs shall be in the Indonesian language. The size, colour, lettering and location of all signs shall be subject to the Engineer's approval. Attention shall be paid to the international system of traffic sign or as applicable in Indonesia.

Where required, or on when directed by the Engineer, the Contractor shall furnish and station competent flagmen whose sole duty shall be to direct the movement of the traffic through or around the Site.

In addition to the requirements of the above Subclauses, the Contractor shall furnish and erect, within or in public areas in the vicinity of the Site, such warning and guide signs as may be ordered by the Engineer.

1.10.2 Payment

- a Separate payment will not be made for complying with the provisions of this Clause 1.10 and the cost of all works required by this clause shall be deemed to be included in the rates and lump sum prices of the various items in the priced Bill of Quantities.